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NEWS

WORLD CHEMICAL OUTLOOK

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News of the Week

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Special Report

Worldwide the chemical industry in 1986 was basically sound. Slow growth in some areas was counterbalanced by plunge in petrochemical feedstock prices, trimming of industry operations to make them cost efficient. **Page 21**

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Oil-Price Squeeze Slows Finland's International Expansion Efforts

Increase in chemical exports and acquisitions in other nations hurt by fall in value of oil-refining products and of oil, gas imports from U.S.S.R.

Patricia L. Layman, C&EN London

For the Finnish chemical industry, the bywords over the past several years have been "internationalization" and "specialization." There is nothing novel about that; the chemical industry worldwide has been working to move away from commodity chemicals to specialties. And very few major chemical producers are not multinational.

But for Finland, the problems have been particularly compelling. In a country with a small population and small domestic market, growth has been predicated on international expansion, both in exports and, more recently, in acquisitions. This year, however, the international drive has been caught in the oil-price squeeze that is affecting all Finnish industry, and the key challenge for the chemical industry is to minimize that squeeze.

Key to the oil-price squeeze is the long-standing payment-in-trade agreement with the Soviet Union. Finland buys a substantial portion of its oil and natural gas from the U.S.S.R. and in return, exports an equal value of goods and services to the Soviets. With the fall in crude oil prices, however, the value of the oil and natural gas brought into Finland has fallen, thereby directly reducing the amount of goods that can be sent back across the Gulf of Finland. Because of the oil price change, any such trade agreements will have to be renegotiated.

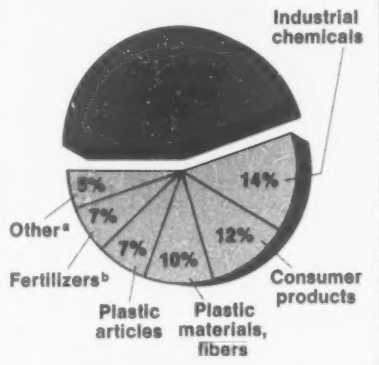
And in a double whammy, the oil-price decline also has hit the value of oil-refining products, by far the largest single category of the country's chemical exports. Similarly, the fall in the value of the U.S. dollar has had a major impact on the Finnish economy, making exports relatively more costly—a problem Finland faces with all its European neighbors. Finland's trade surplus at the end of the first three quarters of this year was $355 million, $226 million less than in the same period of 1985. Exports fell 6% and imports 4% from the previous year's level.

The gross value of Finnish chemical production in 1985 was $5.63 billion, up 6% over 1984. The increase was made up of a 5% rise for industrial chemicals and oil-refining products, and a more than 9% rise for other chemical products—consumer items such as paints and pharmaceuticals. During the first three quarters of 1986, a slowdown occurred, although less in the chemical industry than in industry as a whole. Production of commodity chemicals increased 1.9%, and output of other chemical products rose 3.8% over the same period of 1985.

Moreover, that trend is expected to continue into the first half of 1987, according to Pertti Lehtiö, director for economics and statistics at the Chemical Industry Federation (CIF) of Finland, in Helsinki.

The increases in chemical production in Finland in 1986 came from improved domestic demand and in larger exports to western markets. Lehtiö cites a cut in exports to the Soviet Union as the main reason why chemical exports did not reach quite the same level as they were during the first three quarters of 1985. "Our other export markets are to Western Europe, and as the economy there goes up, our exports will. But not so quickly as we would have wanted," he adds.

Oil refining dominates Finnish chemical industry

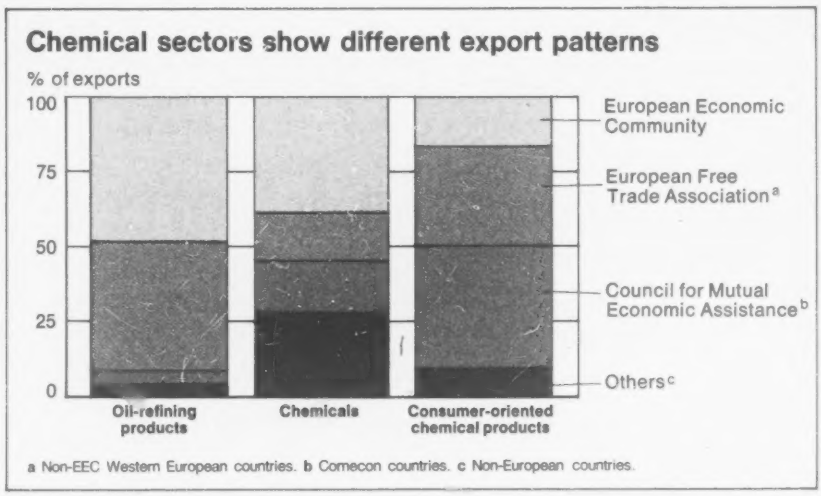


Total value = $5.63 billion

a Rubber articles and petroleum products.
b Includes agricultural chemicals.

Fortunately for the Finnish chemical industry, its exports to the U.S.S.R. and other countries of the Council for Mutual Economic Assistance (CMEA) group, as the Eastern bloc countries prefer to call themselves, account for only about 20% of the total. Nonetheless, that is a significant chunk of business for the industry to see trimmed by changes in import/export agreements between Finland and the CMEA bloc, which are now being renegotiated.

So that puts even more pressure on the Finnish chemical industry to build internationally by exports and, increasingly, by acquisitions. CIF's managing director Raili Nuortila charts the expanded rate of acquisitions by the Finnish chemical industry since the beginning of the decade: Foreign sales of Finnish chemical companies have increased roughly 17-fold since 1981.



And, she predicts, "I wouldn't be surprised if this acquisition program continued for some time. It is all company by company, not a countrywide strategy, but these companies have come to the same conclusion at the same time, based on the criteria of limited domestic markets and worldwide possibilities."

In about 1980, Finnish chemical companies started seriously considering a plan for boosting international business. Most companies started by targeting Scandinavian markets or making Scandinavian acquisitions. For example, the chemicals unit of Neste, the state-owned oil refiner and the largest chemical company, acquired 100% of its joint-venture raw materials company Pekema, in Sweden, about then. "We realized Finland would be too small for us," says Jukka Viinanen, senior vice president for polyolefins.

But that, and subsequent acquisitions in the Nordic area, finally brought the company to the point at which there was nothing more it could do in Scandinavia. Nothing it could do to expand in Norway, for example. "What we could do, we had already done. Therefore we decided to move into Europe," says Viinanen. And move in, Neste has done. Its latest move came in October when Neste agreed to buy the polypropylene plant and related businesses at Beringen, Belgium, from Himont Belgium. The capacity of the Beringen plant is 120,000 metric tons per year. At the same time, Neste announced it would build a new polypropylene plant with an equal capacity at its Porvoo, Finland, plant site. The combined total will make Neste the sixth largest polypropylene producer in Europe.

Neste is already tied, with Dow, for third-largest producer of polyethylene in Europe, with total capacity of 620,000 metric tons per year. It is debottlenecking its phenol unit, to raise capacity to 75,000 metric tons per year, and it is switching its cumene process to the Monsanto process, doubling capacity to 140,000 metric tons in the existing plant.

"The players are getting bigger and stronger, and there will be fewer of them," Viinanen says. Neste, he adds, "is joining the top league," particularly in polyethylene, by competing throughout Europe.

Chemicals producer Kemira was using a similar strategy when it acquired American Cyanamid's titanium dioxide works in Savannah, Ga., in 1985. That deal made Kemira the fifth largest titanium dioxide producer in the world, with 80,000 metric tons of capacity in Finland, at Pori, and 88,000 metric tons in Savannah. It also gave the company important access to North American markets; Kemira already exports about 85% of its Pori-produced titanium dioxide.

But then, why should Finnish chemical companies not go international, asks Henry Tuderman, director of Nokia Chemicals, in Äetsä, a unit of pulp and paper producer Nokia Corp. "We are forced to compete on home ground with big international companies so why should we not go anywhere else in the world?"

As Tuderman sees it, Finnish chemical companies have few alternatives to moving into the international marketing scene. For example, one of the major markets for chemicals in Finland—pulp and paper—is drifting away to other countries, he points out. The demand for chemicals is changing because of more recycled paper, harder pulps and stocks, and tightening environmental controls. Companies have to provide the products customers want, and the only way really to know what those product demands are is to be in the markets where the customers are, he suggests.

But how do companies enter those international markets successfully? For a relatively small country such as Finland, where companies might have trouble gathering sufficient resources to exploit international distribution or marketing, "strategic alliances" might fit the bill, suggests James R. Hickey, managing director of consultants Strategic Analysis Europe, in Brussels.

He cites as examples two new ventures involving Finnish firms working to move technology into the world market. In one, pharmaceuticals producer Orion Corp. of Espoo is working with Du Pont to commercialize Orion's patented technology in nucleic acid sandwich hybridization. Du Pont will use its know-how to market and improve the technology throughout the world.

Similarly, Nokia Chemicals has an agreement with Canadian engineering firm Chemetics International Co., in the Toronto suburb of North York, to build plants using Nokia's cell technology for sodium chlorate production. The deal brings the Finnish technology to the world marketplace with much more ease than might have been otherwise.

"Finland more than most other countries must look global, given the size of the domestic or Scandinavian market," Hickey argues. Business alliances of this nature will help the country's chemical industry penetrate foreign markets more rapidly. He predicts that the number of such ventures will rise, as Finnish firms continue to implement their internationalization strategy. □

WORLD CHEMICAL OUTLOOK

The world's chemical industry is ending 1986 in basically sound condition. Although demand is growing at a snail's pace for many chemical products, at least it generally is holding up. Agricultural chemicals, though, are a notable exception as crop surpluses crimp demand while manufacturing capacity continues to expand worldwide.

Offsetting the slow growth to a considerable degree, however, is the sharp drop in petrochemical feedstock prices during the past year or so. Even more beneficial have been the major efforts to restructure chemical operations in recent years. Marginal businesses have been shut down or sold off and manufacturing operations generally streamlined. The resulting reduction and consolidation of existing plant capacity have resulted in an international industry that is basically leaner and more cost efficient, and hence better structured to cope with the challenges that accompany increasing maturity.

That chemicals are still viewed as a key to economic growth is evident in the ambitious expansion plans of such disparate nations as the Soviet Union and its East European satellites; Mexico; and Saudi Arabia. That international competition remains fierce is clear from the marketing problems burdening chemical producers in Japan and Canada, not to mention the U.S. and Western Europe.

Slow growth notwithstanding, though, the economic foundations of the chemical industry seem firmer now than at any time in the recent past.

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UNITED STATES

Earnings rebound despite only modest growth in demand

Chemical output probably will continue to expand slowly, but profitability will be much improved for a restructured industry

David M. Kiefer, C&EN Washington

The U.S. economy, as it enters its fifth year of expansion, clearly is creaking. Gross national product will rise a rather anemic 2 to 3% this year, close to the rate of growth chalked up in 1985. Industrial production, overall, will be up only about 1% for the year as a whole and is ending the year at about the same level at which it began.

The chemical industry is doing a bit better than that—but not by much. Output of industrial chemicals, for the year as a whole, will average about 4 to 5% higher than in 1985. But production now is less than 3% above what it was as the year began. Meanwhile, selling prices for industrial chemicals are down about 5% from year-ago levels. As a result, the industry's sales volume this year will be only marginally higher than last year.

In past years, such a business climate of slow demand growth and weak prices frequently led to depressed earnings. This year, however, is different. Profits have rebounded smartly for makers of industrial chemicals. For the year as a whole, in fact, operating income may be up roughly a third from 1985.

Several factors are responsible for the industry's much improved profitability. The decline in the cost of energy and petrochemical feedstocks has been an important boon. The weakening of the U.S. dollar against the currencies of other major industrialized countries also has helped; since the dollar began to slip nearly two years ago the translation of overseas revenues into U.S. income statements has had a positive rather than a negative influence on the bottom line.

But more than anything else, the chemical industry's income statements have benefited this year from the massive restructuring of operations that took place in 1985 and, to a lesser degree, earlier. Plant closures, asset sales and write-downs, and reductions in management and professional staffs have drastically cut operating overhead, eliminated marginal operations, and trimmed excess capacity. As a result, this year, the industry has been operating more efficiently and productively than at any time in the recent past.

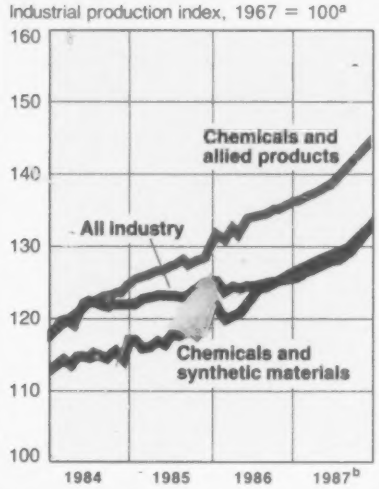
Comparing this year's earnings with those of the previous year can be misleading, to be sure. The huge write-offs and other nonrecurring charges that were part of last year's restructuring program abnormally and unexpectedly depressed earnings. The basic chemical industry was operating in the red during the second half of 1985, in fact, according to Census Bureau data. And many of the industry's leading firms reported a deficit for the year as a whole. To some degree, the extraordinary costs associated with restructuring can be excluded in making a comparison with this year, but not completely. So the gains in profits being reported this year are not really so strong as they may appear to be. Even so, profitability certainly is much more robust now than it was a year ago.

This year may be a hard act to follow, but next year, nevertheless, promises to be pretty much a replay of 1986. That, at least, seems to be the consensus among industry officials as the year draws to a close. Nobody really is looking for an upsurge in demand for chemicals. But further moderate expansion still looks like a good bet. And selling prices for chemicals have shown signs of being somewhat firmer lately, with some increases probable during the year ahead. In addition, the industry probably has not yet reaped all the benefits from its restructuring. Prospects look good, therefore, for a second year of much improved earnings for the industry—although the gains may be only about half as large as those being scored this year.

Because its customers are spread so widely throughout the U.S. economy, the chemical industry's performance hinges heavily on trends in the economy as a whole. And although a few economists are turning gloomy about the nation's economic outlook, a clear majority are still optimistic now, if only in a relatively moderate way. The prediction for next year is that gross national product will continue to expand at about the same rate as it has in the past two years, or perhaps just a bit more—thereby adding another year to a period of unprecedented economic stability.

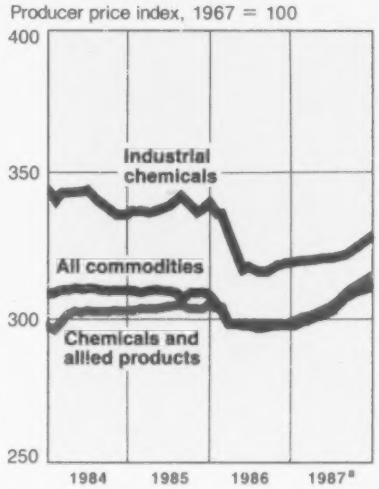
If the overall rate of expansion manages to remain little changed, though, it is not likely that trends among the individual components of the economy will remain the same. During the past 12 months, the economy has been largely consumer driven. That is one reason why chemical production has outpaced that for all industry, since the bulk of the chemical industry's products ultimately wind up in the hands of consumers.

Production is climbing at a sluggish pace



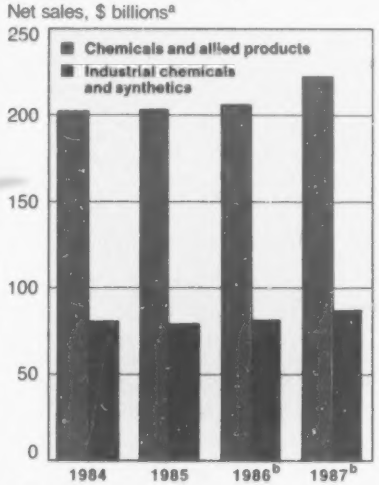
a Seasonally adjusted. b C&EN estimates.
Source: Federal Reserve Board

A slow erosion of prices probably is ending



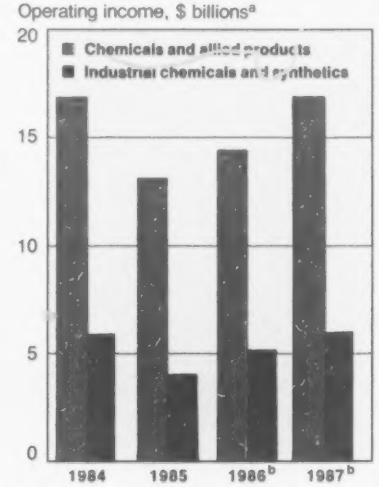
a C&EN estimates.
Source: Bureau of Labor Statistics

Sales volume has been relatively flat lately



a Excludes sales of foreign subsidiaries. b C&EN estimates. **Source:** Bureau of the Census

But profits are rebounding smartly at present



a Excludes nonoperating income and expenses and income taxes. b C&EN estimates.
Source: Bureau of the Census

It will be surprising, though, if consumers continue to play such a dominant role. For one thing, consumer debt recently has been abnormally high and consumer saving has dwindled to an extraordinarily low level relative to income. Both can be expected to shift to more normal levels during the year ahead, leaving fewer dollars available to chase after consumer goods. This may be offset, at least in part, by money released into the economy by next year's lower tax rates, however. And as long as inflation stays in check—consumer prices will be up less than 2% this year, the lowest inflation rate in more than 20 years—and interest rates continue close to current low levels, consumer spending can be counted on to remain a strong factor behind expansion.

A slight gain in capital investment next year is likely to take up a bit of any slack that may develop in consumer spending. In addition, hopes are rising that a turnaround now is taking place in the U.S. balance of foreign trade. The weakening of the U.S. dollar abroad has surprisingly done little or nothing to stem the flood of imports or generate higher exports from the U.S., in part because the prices of many imported goods have not risen as the dollar has fallen. But now there are a few tentative initial signs that the trade deficit may fall during 1987 (see page 27). In fact, the U.S. International Trade Administration is forecasting that it will shrink significantly. That would provide considerable support for the overall economy.

The chemical industry, in the meantime, already has witnessed some welcome improvement in its foreign trade, with exports this year up 4%. That bodes well for 1987.

For several key markets for chemicals and the products made from them, however, the outlook has become a bit more shaky.

The automotive market is one that is not expected to be quite so robust in 1987. Sales, by and large, have been strong for car producers, at least whenever they were temporarily pumped up by such sales incentives as price discounts or reduced debt carrying charges. But imported cars continue to eat away at Detroit's market share, accounting for about a third of sales recently.

Total output of cars in the U.S. consequently dipped to under 8 million from 1985's 8.2 million. Auto industry officials foresee a further decline in 1987. U.S. car sales now are being forecast to fall by as much as a million below the nearly 11.5 million sold this year, whereas imports probably will make further market gains. The upshot could be a 10 to 15% drop in U.S. production.

Housing is another market in which demand may ease slightly. New housing starts have been dwindling all year long, after hitting a two-year peak last January. Because they led off the year at a fast pace, total starts probably will hit 1.80 million to 1.85 million, 3 to 6% higher than in the previous year. That's the most for any year since 1978. But with no development in view to reverse the current trend downward, housing starts next year are likely to trail this year's total by

about 200,000, a drop of more than 10%, putting a crimp in demand for plastics, fibers, and coatings.

Softening the blow a bit, however, is that most of the decline will be in multifamily buildings rather than single-family homes; a high rate of vacancies in existing apartments coupled with income tax reform that axes the tax shelter advantage of investing in housing developments is largely to blame. Meanwhile, the size of the average new single-family home—as well as its cost—has been increasing. In addition, makers of housing materials are winning sales from greater spending by homeowners to maintain and upgrade existing houses.

A cutback in home building next year also may bring a slowdown in growth for some other significant markets for chemical products. Appliance output, for example, is 8 to 10% higher this year, a rate of growth that is not likely to be matched in 1987. This year's 3% increase in furniture production likewise is unlikely to be repeated during the year ahead.

The textile industry, too, has benefited from the rise in home building. Increased demand for carpeting and specialty fabrics, for one thing, has been a major factor behind this year's 5% increase in nylon output and 8% rise for polyolefin fibers. But rising imports continue to severely undercut U.S. production of fibers for clothing. Even so, 1986 has been a good year for textile mills compared with some in the immediate past. Next year, import restrictions and various industry programs aimed at encouraging the purchase of U.S.-made apparel may bring further growth in fiber demand.

The outlook remains bitterly bleak, on the other hand, for the U.S. agrochemical market. Excess production, dwindling exports, low prices, and financial crises have sharply curtailed farmers' purchases of fertilizers and pesticides. Government farm programs also have reduced the acreage of land being planted; U.S. farmers this year took 44 million acres out of production in exchange for government subsidies. Meanwhile, overseas markets for farm chemicals are shrinking as more of the world's developing nations turn to local production and farm surpluses increase abroad. The upshot is that U.S. production of ammonia, nitric acid, and phosphoric acid is down 15% or more. Pesticide markets, too, have been hit by increasing federal regulation.

Further reduction in farm acreage is slated for 1987, as the government strives to cope with huge carryovers of feed grains. And despite the weakened dollar, exports of fertilizers show no signs of improving. As a consequence, demand for fertilizer will drop once more, prices will remain weak, and profits in the agrochemicals business will be poor again in 1987.

Elsewhere in the chemical industry, however, although the outlook may not generate a wave of enthusiasm, it at least is encouraging. Spurred by an improving climate for foreign trade and another year of relatively strong consumer spending, production of chemicals, plastics, and fibers probably will be up 5 to 8%, with output in the broader chemicals and allied products industry rising 4 to 6%. Pricing will be less of a negative factor on revenues, as well. Sales consequently will be 5 to 10% higher than in 1986. And with costs in hand and plant efficiency improved, profits probably will rise again next year, perhaps 15 to 20% to a six-year high. □

Except for fertilizer materials, the outlook is moderately upbeat for chemical production

	1984	1985	1986	1987
INORGANIC CHEMICALS				
Thousands of tons unless otherwise indicated				
Ammonia	16,692	16,201	13,800	13,100
Chlorine gas	10,700	10,402	10,600	11,000
Hydrochloric acid	2,693	2,807	3,050	3,200
Nitric acid	7,726	7,778	6,500	6,200
Oxygen, billions of cu ft	387	393	405	420
Phosphoric acid	11,370	10,492	8,950	8,500
Sodium hydroxide	10,914	10,811	11,200	11,500
Sulfuric acid	41,802	39,615	36,500	35,400
ORGANIC CHEMICALS				
Millions of lb unless otherwise indicated				
Acetic acid	2,619	2,897	3,000	3,150
Acetone	1,862	1,788	1,900	1,950
Acrylonitrile	2,219	2,349	2,250	2,350
Benzene, millions of gal	1,318	1,283	1,320	1,370
Butadiene	2,452	2,340	2,500	2,600
Cumene	3,754	2,627	2,800	3,000
Cyclohexane	1,994	1,657	2,000	2,200
Ethylene	31,383	29,846	32,100	34,200
Ethylene glycol	4,823	4,178	4,400	4,600
Formaldehyde	5,815	5,606	5,800	6,000
Methanol	8,186	5,003	5,600	6,100
Phenol	2,869	2,841	2,950	3,050
Phthalic anhydride	870	820	860	900
Propylene	15,559	14,887	17,000	18,200
Styrene	7,709	7,622	7,950	8,350
o-Xylene	688	675	750	780
p-Xylene	4,264	4,779	5,200	5,500
PLASTICS				
Millions of lb				
Polyethylene, high density	6,085	6,671	7,150	7,600
Polyethylene, low density	8,413	8,889	8,900	9,200
Polypropylene	4,940	5,139	5,700	6,050
Polystyrene	3,838	4,054	4,400	4,600
Polyvinyl chloride	6,760	6,772	7,200	7,400
SYNTHETIC FIBERS				
Millions of lb				
Acrylic and modacrylic	671	631	620	640
Nylon	2,412	2,343	2,470	2,550
Olefin and vinyon	997	1,249	1,350	1,420
Polyester	3,392	3,341	3,300	3,400

Sources: Bureau of the Census, International Trade Commission, Society of the Plastics Industry's Committee on Rosin Statistics, Textile Economics Bureau, C&EN estimates (for 1986 and 1987)

FOREIGN TRADE

With exports rising once more, U.S. chemical trade surplus shows small gain

World trade in chemicals continues to expand, but currency exchange rates mask the extent of the growth this year

Earl V. Anderson, C&EN New York

Statistics on world chemical trade—always suspect because of the variety of sources and data systems from which they must be gleaned—are even more suspect this year. The problem is the drastic change in the dollar exchange rate.

Based on the most recent available data, world chemical trade, measured as exports, may hit a hefty $184 billion this year, a surprising 20% more than in 1985. Given the less-than-robust economic conditions throughout the world, most chemical trade experts agree that a 20% gain in chemical trade is highly unlikely. A more plausible gain would be about 5%.

But drastic changes in monetary exchange rates can cause such statistical aberrations. From its peak in March 1985, the U.S. dollar has fallen more than 25% against a basket of 13 major foreign currencies, according to the Department of Commerce. Since the first of the year, it has dropped 11% against that same currency basket.

The sharply weaker dollar is great for those who had invested money in international mutual funds. It's not so great, however, for those who have to compile international trade statistics.

Much of the difference between a dollar-based 20% rise in world chemical trade and a more rational 5% estimate lies in the chemical trade statistics of the 12-nation European Economic Community. On a dollar basis, EEC chemical exports likely will come close to $100 billion this year, 25% higher than last year.

However, EEC officially reports its statistics in European Currency Units (ECUs). Actually, an ECU is a "basket" unit, based on a certain quantity of the currency of each member nation and weighted according to gross national product and trade. In ECUs, chemical exports from EEC countries ran only 4% higher than last year through the first six months. Meanwhile, there are about 20% more dollars per ECU this year than there were last year.

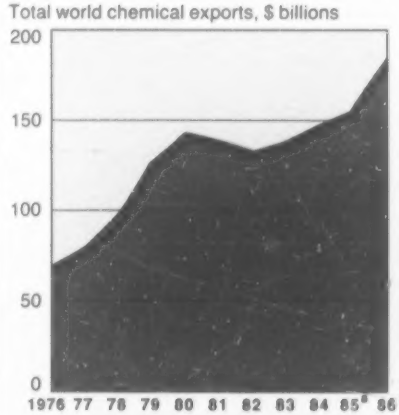
The same situation exists for Japanese chemical exports, because the yen has appreciated so much against the dollar. This year, for instance, Japanese chemical exports will be up 22% if the dollar is the yardstick. They will be down 14%, however, if the yen is used as the measure.

But even on a dollar basis, Japanese chemical exports will be only about $9.4 billion this year, roughly 5% of the world total. However, as a block, EEC is by far the world's largest chemical exporter, with a commanding 55% of the world market. Thus, if its chemical exports are really up only 4% whereas the exchange rate between ECUs and dollars has changed almost 20%, this year's growth in world chemical trade can be misleading when all of the pieces are converted to dollars.

For U.S. chemical producers, this statistical malfeasance is unfortu-

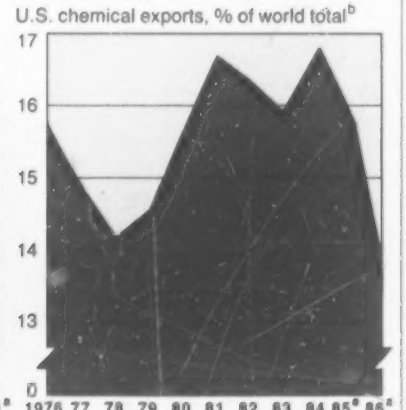
World trade in chemicals is sharply higher . . .

Total world chemical exports, $ billions



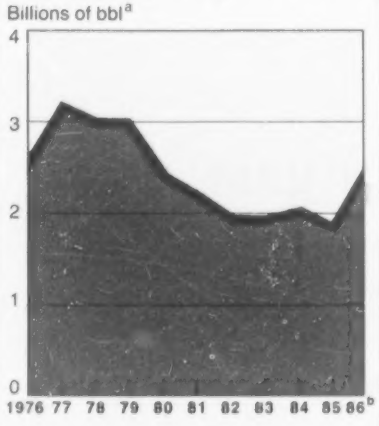
. . . but U.S. share of the total plunged recently

U.S. chemical exports, % of world total[b]

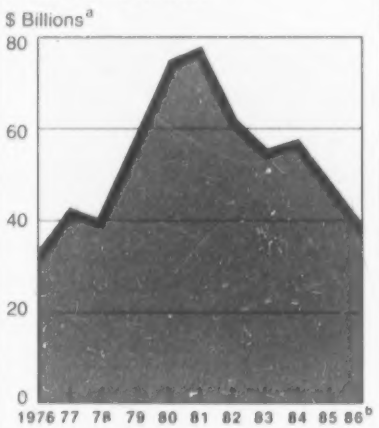


a C&EN estimates. b Defined as U.S. chemical exports as per cent of world chemical exports less U.S. chemical imports.
Sources: United Nations, Bureau of the Census

U.S. imports of oil are rebounding this year . . .

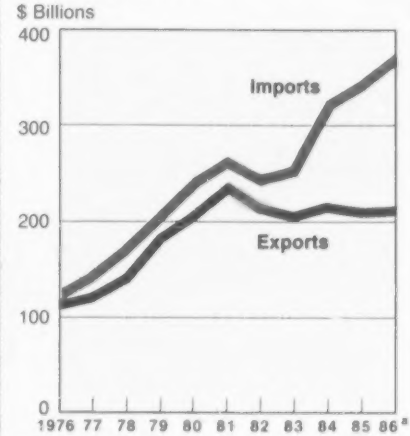


. . . but lower prices keep their cost down

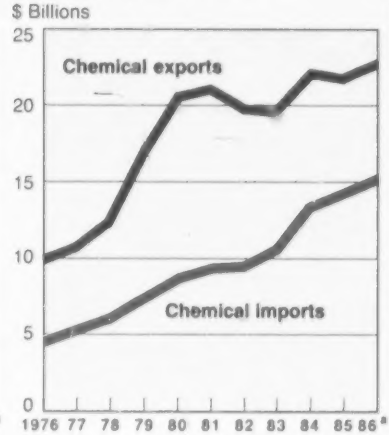


a All petroleum products. b C&EN estimates.
Source: Bureau of the Census

Overall U.S. trade deficit hits new highs . . .



. . . but the slide in chemical trade surplus ends



a C&EN estimates. **Source:** Bureau of the Census

nate, because it detracts somewhat from their otherwise satisfying trade performance in 1986. Based on exchange rate arithmetic, U.S. chemical exporters will lose a substantial share of the world market this year, when more than likely, they will maintain or slightly increase their share.

Not that this year's 4% increase in U.S. chemical exports is all that impressive. But compared with last year's 3% drop, it's not bad.

Besides, this year's $22.6 billion worth of overseas shipments sets a new record for U.S. chemical exports, breaking the old high set two years ago. Meanwhile, chemical imports are being held to a similar 4% advance, half of last year's increase.

Thus, chemical imports will weigh in at about $15.1 billion by year's end. That, too, is a new record, but it signals a welcome end to the five-year slide in the U.S. chemical trade surplus. That surplus hit $12.1 billion in 1982, but it has slipped every year since then. Last year, it bottomed out at $7.2 billion.

This year, the U.S. chemical trade surplus should inch back up to $7.5 billion. After watching the strength ebb out of the dollar for more than a year and a half, that performance may not be so good as some chemical traders had expected. But it cer-

Plastics, organic chemicals, and pharmaceuticals lead growth in U.S. chemical exports

$ Millions	U.S. chemical exports				U.S. chemical imports			
	1986[a]	1985	1984	1983	1986[a]	1985	1984	1983
Organic chemicals	$ 6,305	$ 6,012	$ 6,093	$ 5,326	$ 4,790	$ 4,576	$ 4,265	$ 3,477
Plastics and resins	4,317	3,777	4,050	3,732	1,903	1,631	1,484	1,098
Medicinals and pharmaceuticals	3,096	2,708	2,628	2,494	1,225	1,084	931	703
Fertilizers, manufactured	1,876	2,160	1,815	1,267	936	967	1,142	997
Inorganic chemicals	1,763	1,967	2,184	1,838	1,965	1,948	2,064	1,615
Radioactive materials	1,130	1,311	1,421	1,213	1,195	1,417	1,394	952
Pesticides and disinfectants	700	614	707	630	433	399	308	251
Flavors, perfumes, cosmetics, and toiletries	497	478	498	493	861	577	521	370
Pigments, paints, and varnishes	340	322	335	328	347	266	232	145
Cleaning and polishing materials	294	292	308	295	24	172	118	90
Dyeing, tanning, and coloring materials	158	139	158	163	483	352	358	300
Explosives and pyrotechnics	90	100	146	87	106	103	84	64
Miscellaneous	2,034	1,878	1,992	1,885	831	1,005	797	717
TOTAL	$22,600	$21,759	$22,336	$19,751	$15,100	$14,533	$13,697	$10,779

a C&EN estimates. **Source:** Bureau of the Census

With exports little changed, higher manufactured imports increase U.S. trade deficit

$ Billions	U.S. exports 1986[a]	1985	1984	1983	U.S. imports 1986[a]	1985	1984	1983
Chemicals	$ 22.6	$ 21.8	$ 22.3	$ 19.8	$ 15.1	$ 14.5	$ 13.7	$ 10.8
Machinery and transportation equipment	93.8	94.3	90.0	82.6	159.6	137.3	119.2	86.1
Other manufactured goods	30.1	29.3	30.8	30.0	104.6	95.0	88.6	66.5
Food and live animals	16.9	19.3	24.5	24.2	21.0	18.6	18.0	15.4
Beverages and tobacco	2.6	3.0	2.9	2.8	3.6	3.7	3.7	3.4
Mineral fuels, lubricants, and related materials	8.2	10.0	9.3	9.5	40.1	53.9	61.0	58.0
Crude materials (inedible) other than fuels	16.5	16.9	20.2	18.6	10.7	10.4	11.1	9.6
Animal and vegetable oils and fats	1.1	1.4	1.9	1.4	0.5	0.7	0.7	0.5
All other products	10.7	11.0	10.1	7.0	14.8	11.1	9.8	7.7
TOTAL	$214.3[b]	$213.1[b]	$217.9[b]	$200.5[b]	$370.0	$345.3	$325.7	$258.0

a C&EN estimates. b Includes re-exported imports (not included in individual product categories). **Source:** Bureau of the Census

tainly is better than the overall U.S. trade picture. By now, "trade deficit" has become almost a household phrase and most households know that the U.S. is heading for yet another record trade deficit.

Most reliable estimates have this year's deficit topping $170 billion, up from last year's $148 billion. These numbers are based on imports figured on a c.i.f. (cost, insurance, and freight) basis.

The older, more conventional way to figure trade balance is to compare exports with imports valued on a f.a.s. (free alongside ship) basis. Using this approach, the U.S. trade deficit this year will be "only" $156 billion, 18% higher than 1985's $132 billion. That may be easier on the eye than the c.i.f. trade deficit, but it is no easier to swallow.

Behind the swelling U.S. trade deficit are U.S. exports that barely managed to creep ahead less than 1% to $214 billion this year, while imports grew faster than they did last year. The 7% growth in imports puts them at a record $370 billion.

This turn of events has frustrated U.S. trade officials, especially since they cannot blame increasing prices for U.S. oil imports for the higher trade deficit. Imports (of all petroleum products) are going up—from 1.8 billion barrels last year to a bothersome 2.4 billion bbl this year. But the import price tag will drop to $37.5 billion, 22% lower than last year.

Unfortunately, most of the fault lies in the trade of manufactured goods. Despite the drop in the dollar's value, the U.S. trade stance in manufactures has worsened.

U.S. exports of manufactured products, classified in three major trade categories, barely increased this year. Yet imports of these same three categories of manufactures are rising 14%. This trade alone accounts for $140 billion of this year's $156 billion total U.S. trade deficit.

It was not supposed to happen this way. According to economic theory, the weaker dollar is supposed to spur exports, lower imports, and reduce the trade deficit.

In the past few months, there have been indications that this is exactly what is happening. Exports have perked up and import growth has tapered off. The trade deficit is improving.

But why did it take so long? There is no shortage of possible explanations. One is the "J-curve" effect on imports, particularly from Japan and Europe. Although the falling dollar should reduce imports by making them more expensive, these higher prices increase their dollar value before volume falls far enough to make a difference.

Another explanation is that the dollar may not have fallen so much as the government claims it has. The decline in the dollar's value can vary, depending upon which currencies are used in the comparison basket and what kind of weighting is given to each currency.

The Federal Reserve Board index of the dollar's value against major industrial country currencies pegs it at 7% above its 1981 level. But economists say that this figure doesn't give enough weight to the currencies of Canada and major newly industrialized countries. The dollar hasn't fallen against these currencies. Using a basket of 44 foreign currencies, Morgan Guaranty Trust calculates that the value of the dollar is still 50% above its 1981 level.

Finally, there are those who claim that U.S. industry simply is not competitive in world markets. U.S. industrial competitiveness has received a lot of attention lately. It is certain to receive much more in the next few years. □

U.S. chemical exports higher in most big foreign markets

$ Millions	1986[a]	1985
U.S. CHEMICAL EXPORTS		
Canada	$ 2,757	$ 2,698
Latin America	3,932	3,681
Western Europe	7,052	6,742
Eastern Europe	384	368
Japan	3,028	2,908
Australasia	678	704
Communist Asia	407	513
Middle East	339	400
Rest of Asia	3,300	3,023
Africa	429	456
Other	294	265
TOTAL	$22,600	$21,759
U.S. CHEMICAL IMPORTS		
Canada	$ 2,893	$ 2,913
Latin America	1,027	1,216
Western Europe	7,293	7,118
Eastern Europe	393	380
Japan	1,812	1,412
Australasia	226	231
Communist Asia	166	163
Middle East	241	218
Rest of Asia	604	457
Africa	257	203
Other	242	222
TOTAL	$15,100	$14,533

a C&EN estimates. **Source:** Bureau of the Census

WESTERN EUROPE

Growth is spotty but chemical operations hold at a relatively high level

Lower feedstock costs and capacity cutbacks help offset impact of import competition and weakening prices

Dermot A. O'Sullivan, C&EN London

Summarizing the present state of the chemical industry in Western Europe, Heinz Klaar draws an analogy with the popular winter sport in his native Netherlands. "We are skating on beautiful ice, but it is rather thin," says the vice president of Shell Chemical International Trading Co.

What Klaar is saying, in effect, is that European petrochemical firms, in particular, will come through this year in reasonably good business shape. Unless something unexpected happens, the same pattern will be maintained in 1987.

Both positive and negative factors have shaped Europe's economic climate, although their effects are complex and frequently counteracting. Most notable this year were the impact of a continuing slide in the U.S. dollar's value against major European currencies, and the drop in crude oil prices.

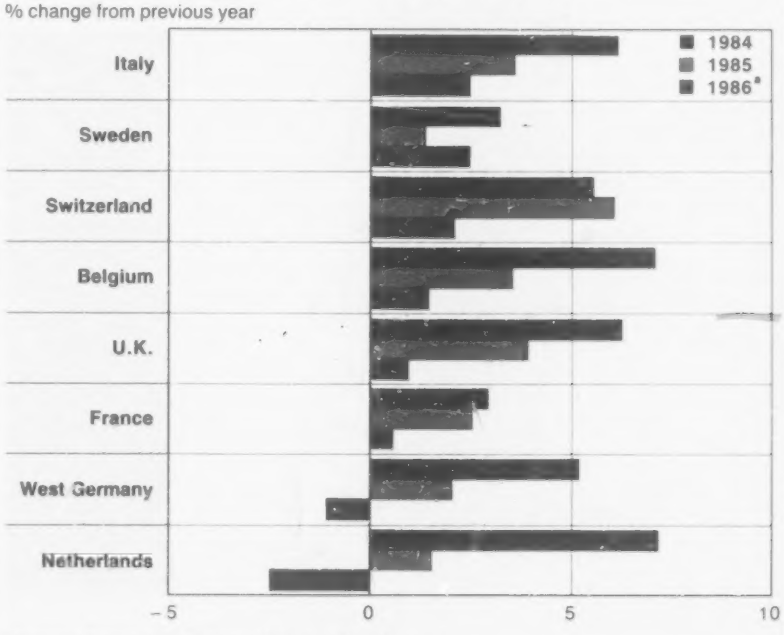
Between January and September this year, the dollar lost 16% of its value against the West German mark, 15% against the Italian lira, 11% against the French franc, and a more modest 3% against the U.K. pound sterling. Indeed, the plunge in the dollar that set in early last year may go yet further before leveling out.

February 1985 marked the peak of the dollar against the U.K. currency, when it climbed 44% above its value against the pound in January 1983. In the case of the French, West German, and Italian currencies, the dollar reached its exchange rate peak in March 1985.

One positive effect of the lower dollar on European companies is a cut in interest payments, in local currency terms, due on their dollar-denominated debts. On the negative side, European-made goods are encountering stiffer competition from U.S. products sold in Europe and in dollar trading zones.

Sales and profit figures recorded in dollars also appear lower when translated into the currency of the European parent companies. Hermann-Josef Strenger, chairman of West Germany's Bayer, for example, noting the 12% decline in worldwide sales of his company (reported in deutsche marks) during the first nine months of this year compared with last year, says that currency fluctuations alone were responsible for a drop of 11%. Likewise, Wolfgang Hilger, chairman of Frankfurt-based Hoechst, says that more than half of the 15.4% fall in Hoechst's sales outside West Germany between January and September resulted from currency translation.

Growth generally eases for chemical production



[a] Estimated. **Source:** National chemical federations for each country

For Imperial Chemical Industries (ICI), based in London, the effects of varying exchange rates are more complex. The strengthening of the pound against Australian, Canadian, and U.S. currencies was offset to a degree by sterling's weakening against the deutsche mark and other European currencies. The net result was a 4% decline in the value of ICI's sales, in pounds, in this year's first nine months from that during 1985's like period.

On a more positive note, the weaker dollar has meant that dollar-priced oil, both for energy and as a source of chemicals, has become less expensive for Europeans. Coupled with this, of course, is the fall in the price of oil itself. The spot price of oil dropped from about $26 a barrel last December (which, in turn, was down from nearly $40 in 1980) to below $10 this past July. It since has rebounded to the $14 to $15 range. The Organization of Petroleum Exporting Countries (OPEC), at the urgings mainly of Kuwait and Saudi Arabia, is talking about raising the price of oil to $18 a bbl or more. But when that will come about is anybody's guess.

Some observers maintain that Saudi Arabian petrochemical plans in particular are being negatively affected by lower-than-anticipated oil production, resulting in less availability of associated gas for feedstock. Moreover, they argue, the competitive edge of Saudi products has been dented somewhat. This could explain the switch to high-density polyethylene in preference to linear low-density polyethylene—which calls for C_4 or C_6 α-olefin comonomer that must be imported—in units capable of making either polymer.

Indeed, in Europe itself, analysts now are reworking their forecasts for the relative market trends of conventional LDPE and LLDPE in light of the lower energy costs. And there is the added factor that LLDPE has not been particularly welcomed on the European market, as John N. Turnbull, BP Chemicals' director responsible for polymers, points out—even though his company started up a 220 million lb-a-year dual-purpose HDPE/LLDPE unit based on its own gas-phase technology earlier this year at Lavera in the south of France.

"Converters found that LLDPE was difficult to process," he admits. "It requires more energy than LDPE to extrude, and machinery had to be modified or replaced. Furthermore, the advantages of down-gauging [film thicknesses] often could not be realized. So despite the high level of imports from Saudi Arabia last year, penetration of the LDPE market in Europe by LLDPE is well below that in the U.S."

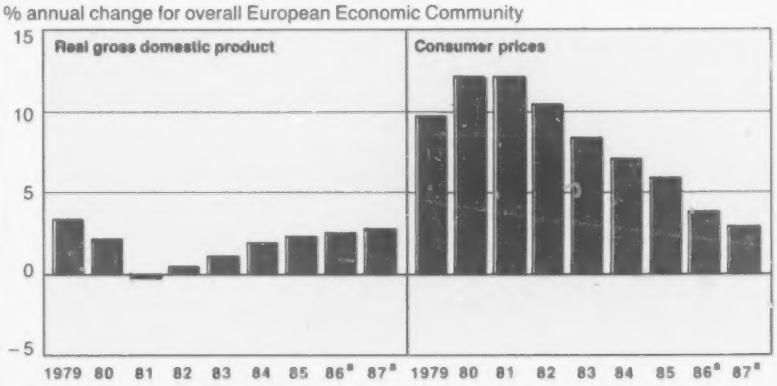
David Oxley, a director leading polymer studies at Chem Systems International's London office, agrees. He notes that LLDPE accounted for less than 10% (902 million lb) of the 9.5 billion lb of combined LDPE and LLDPE used in Europe last year. In the U.S., by comparison, LLDPE's share was about 39% (3.2 billion lb) of the corresponding total of 8.2 billion lb of polyethylenes consumed in 1985.

"Maybe the old high-pressure LDPE process that needs no comonomers or solvent, and produces pellets on a simple extruder, is not obsolete," he conjectures. "Certainly, power use is higher than for LLDPE, but it can be reduced by use of new polymerization initiators, low-energy pumps, and improved heat-recovery systems. And energy may not be so important a factor in a low-oil-price scenario."

Oxley foresees consumption of other commodity plastics—HDPE, polypropylene, and polyvinyl chloride, for example—also growing faster in Europe if the current relatively low oil price continues. HDPE demand, for instance, might advance 3.1% annually between 1985 and 1995 from the 4.1 billion lb used last year, as opposed to the 2.2% rate he thinks likely if oil rises to $18 a bbl or higher. Likewise, polypropylene might move ahead at 4.8% a year (from the 4.5 billion lb

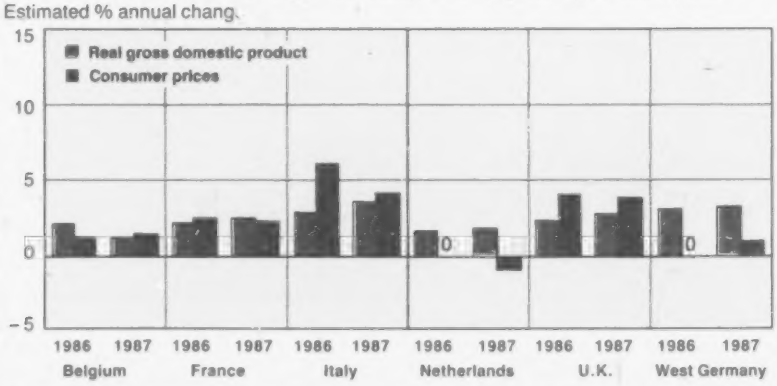
Economic expansion accelerates as inflation eases . . .

% annual change for overall European Economic Community



. . . with West Germany and Italy setting the growth pace

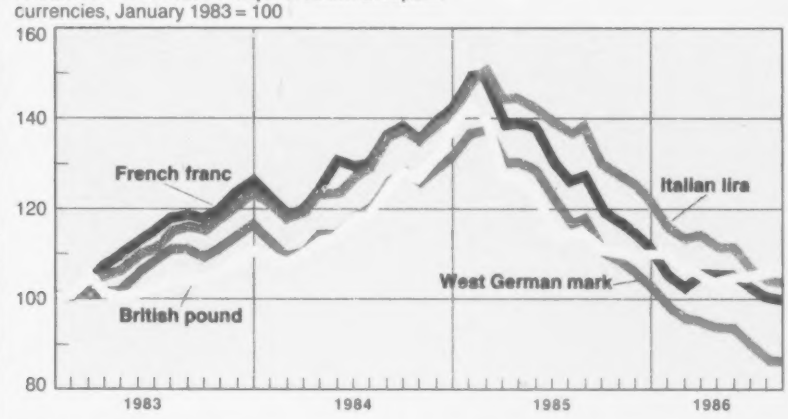
Estimated % annual chang.



a Estimates. **Source:** Commission of the European Communities

Value of dollar in a tailspin in Western Europe

Relative value of U.S. vs. major Western European currencies, January 1983 = 100



Source: International Monetary Fund

consumed in 1985) instead of at a 3.8% rate. And PVC could achieve a 2.6%-a-year growth over the next 10 years (from last year's 8.8 billion lb), as against a 1.6% rate.

Tom O. Hutchison, ICI's director responsible for petrochemicals and plastics, admits that "an increasing number of oil industry pundits are putting their money on the oil price remaining at or around the $15-per-bbl level for some time. Although OPEC is likely to re-establish greater influence in the 1990s," he says, "I believe that future price increases will be progressive rather than discontinuous. The prospects, at least for the next few years, are for oil to be principally influenced by a freer market than we have seen recently. As a result, we will have to live with oscillations in oil and gas prices.

"An unfortunate consequence of price instability is the danger that petrochemical selling prices will be reduced quickly as feedstock prices weaken, but will rise more slowly when they rebound," he warns. "Producers need to exercise sound commercial judgment in order to preserve profit margins."

A spinoff of the oil price decline is that oil and gas activities in the North Sea are being wound down. This has a sharp impact on related industries, and on the economies of the areas they operate from, in Norway and the U.K. particularly. Faced with canceled contracts and declining orders, companies are shedding large numbers of their labor force, thereby adding to an already critical unemployment situation throughout Western Europe.

Indeed, unemployment is the key issue that European Economic Community officials in Brussels are grappling with. It averages almost 12% of the labor force throughout EEC. Spain has the highest rate (about 22%), with Ireland not far behind at 18%. Those with lower double-digit unemployment figures are Belgium (13%), France (10%), Italy (13%), and the Netherlands and the U.K. (each 12%).

Critical unemployment levels notwithstanding, the annual report of the Commission of the European Communities shows some encouraging signs of the state of EEC's overall economy and is generally optimistic for the immediate future. The average inflation rate has come down year by year from its 1981 high of 12.1% to the current estimate of 3.5%. Next year, it might fall further to 3%. At the same time, gross domestic product has been undergoing a steady advance.

"Economic recovery in the community is continuing," the report notes. "Private consumption and investment are the strongest growth elements. Lower price increases and interest rates are improving medium-term growth prospects."

Since January, Portugal and Spain have been full members of EEC, bringing to 12 the number of countries in the community. (The others are Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, the U.K., and West Germany.) Their entry raises EEC's population to more than 320 million from around 275 million.

Changes in chemical production this year don't appear too exciting, on the other hand. Of the countries C&EN polled, Italy, Sweden, and Switzerland show the best output gains relative to 1985, up more than 2%. The U.K.'s chemical output will be up about 1%. France's slim 0.6% advance reflects weakness in fertilizers and the basic mineral products associated with it and of dyes, both of which have retreated 8% from their 1985 levels. Output of fragrances didn't grow. Neither did that of specialties, mainly because of a slowdown in agrochemicals. Best performers were pharmaceuticals (up 6%) and plastics (up 5%).

For West Germany and the Netherlands, chemical output this year will be less than in 1985. But a spokesman for the West German Chemical Industries Association cautions against taking his country's figures too much at face value, noting that 1986 hasn't been that bad considering the good performance in 1985. As he puts it, "If you're driving at 100 miles an hour and you slow to 90, you're still moving pretty fast."

Chemical prices across the board have weakened, meanwhile. In West Germany, the chemical price index in September was 6.5% below January's level and down 8.5% from September 1985. In Italy, likewise, the decline was 5.4% during the first nine months and 7% since September of last year. U.K. chemical producers managed a meager 0.2% gain in prices between September 1985 and September this year, although prices retreated 1.4% during the first nine months. In France, the price

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index is down about 1%, reflecting the oil price drop.

Chemical managers are countering the pressure on prices by running their operations more efficiently and closer to capacity. They are helped in this by the rationalization steps that have been taking place during the past few years in the effort to bring overall capacities closer into line with demand, spurred by the very heavy financial losses they were experiencing. Nameplate capacity of LDPE, for instance, has been reduced 19% since 1980 to about 11 billion lb and that of general-purpose and high-impact polystyrene 17% to some 4 billion lb.

Phaseout of uneconomic crackers has brought Western Europe's ethylene capacity down 13% since 1980 to around 31 billion lb annually. That's only 10% or so beyond consumption, now about 28 billion lb a year.

Commenting on cracker capacities, Jean François Berthlaux, marketing director for basic chemicals at Exxon Chemical International in Brussels, believes "there's a lot more supply capability in the world than you usually see in compilations. Significant increases can and do result from minor efficiencies and debottlenecks that are unannounced and unreported.

"Our assessment shows that these efficiencies account for a worldwide ethylene capacity increase of between 1 and 2% a year. That translates into a capacity addition of one world-scale cracker each year." He reasons, therefore, that there is no need for new ethylene plants in the industrialized world before the end of the next decade.

West Europe slashes petrochemical capacity

Billions of lb	Year-end capacity 1986	1980	% change
Ethylene	31.0	35.6	−13%
Ethylene oxide	3.9	4.6	−14
Polyethylene, high density	5.7	5.6	—
Polyethylene, low density	10.9	13.5	−19
Polypropylene	6.3	4.7	33
Polystyrene[a]	4.1	4.9	−17
Polyvinyl chloride	11.1	12.0	−7

a General-purpose and high-impact polymer.
Source: C&EN estimates

There is some concern about the likelihood that propylene might become tight in Western Europe in view of the projected growth seen for polypropylene production. Shell's Klaar expects the olefin will lose some of its cost advantage relative to ethylene. He also foresees the U.S becoming a more important supplier of propylene and its derivatives to Europe than it has been.

Elsewhere in the West European chemical arena, synthetic fibers' performance has been down somewhat. Output of acrylic, polyamide, and polyester fibers has declined 3 or 4% from last year to levels only marginally ahead of 1984.

Worse off, by far, are fertilizers, which have been adversely affected by a number of factors. One of these was poor weather conditions during the opening months of the year. Another is that farm incomes, generally, have been depressed. Aggravating the situation for local producers were increased shipments of low-priced urea into Europe.

The EC Commission is looking at urea exported by Czechoslovakia, East Germany, Kuwait, Libya, Saudi Arabia, the Soviet Union, Trinidad and Tobago, and Yugoslavia in an antidumping investigation that was launched at the behest of the European Council of Chemical Manufacturers' Federations (CEFIC). Imports from these eight countries have grown more than 10-fold in the past two years—1.86 billion lb during the 1985–86 fertilizer season compared with 156 million lb two years earlier, according to CEFIC—and now account for about 25% of EEC's urea fertilizer market.

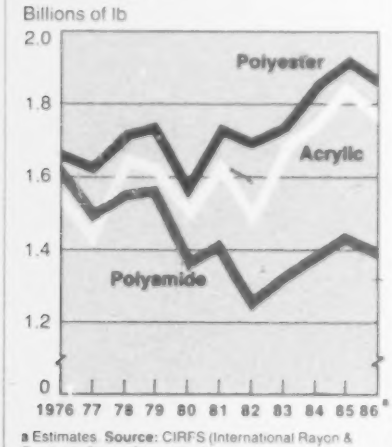
There still seem to be opportunities for chemical companies to make money in the agricultural sector, however. "We forecast a good future for agricultural chemicals in Europe," Du Pont says, "following our round of acquisitions and joint ventures in the crop protection area and introduction of the first members of our new sulfonylurea herbicides."

To strengthen their competitive position in the marketplace, European chemical concerns continue to reshape their own organizations and link up with others. ICI, for instance, has merged four mainstream chemical businesses into a single entity with sales of about $5 billion annually. Called ICI Chemicals & Polymers, it brings together the company's activities in catalysts, chlorine and its derivatives, mineral products, petrochemicals, plastics, and surface coatings when it officially becomes operational Jan. 1.

During the past year, ICI agreed with Enka, the fibers arm of AKZO of the Netherlands, to acquire Enka's nylon 6 interests in exchange for its commodity polyester staple operations, except those in Portugal and Spain. It also formed a joint venture with Italy's Enichem that pools the polyvinyl chloride activities of both and now trades as European Vinyls Corp. By phasing out excess capacity and trimming personnel, the new firm will be in a better position to turn a profit in place of the losses of the partners in their PVC businesses.

Atochem of France and BP Chemicals, too, have linked up. They are consolidating their polypropylene operations in Appryl, a new venture owned 51% by Atochem and 49% by BP. The new company has two production sites in France. When expansions are completed in 1988, Appryl, with an annual capacity of 550 million lb, will rank fifth among Western Europe's polypropylene producers. □

Growth stalls for European fiber output



a Estimates. Source: CIRFS (International Rayon & Synthetic Fibers Committee)

JAPAN

Chemical companies look to specialty products to restore failing health

Faltering economy, export slump, import competition bedevil short-term outlook for chemical industry

Earl V. Anderson, C&EN New York

"Another year of struggle." That's how one Japanese chemical company executive describes this fiscal year for the Japanese chemical industry. What he worries about now is whether he will have to use that same phrase when it comes time to describe fiscal 1987.

That's entirely possible, unless the government's plan to stimulate the economy does more than skeptical industry leaders expect it to. At the end of October, the Bank of Japan trimmed its official discount rate to a postwar low of 3%—the fourth cut in that key rate since January.

Behind the rate cut lies a faltering Japanese economy and the deflationary impact of a sharply appreciating yen. The yen, which stood at almost 260 to the U.S. dollar at the beginning of 1985, fell to 200 by the end of the year. It dropped further to 162 early this month.

As a result, export-oriented companies in Japan have cut back production and reduced capital investment. Some have even eliminated jobs, which is rare in Japan.

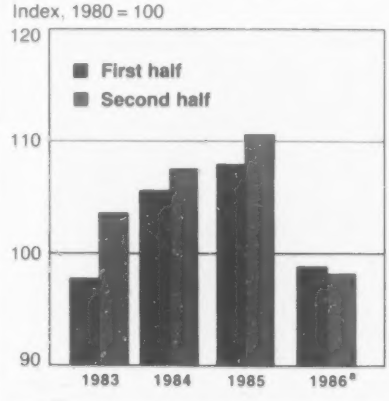
One unmistakable measure of the economic problems facing Japan's manufacturers: Nissan Motor Co., Japan's leading auto maker, suffered an operating loss of 19.7 billion yen (about $120 million) during the first half (April to September) of fiscal 1986. It was the company's first loss since it was listed on the Tokyo Stock Exchange in 1951.

The strong yen has spread its economic carnage among Japanese chemical companies as well. A C&EN survey of 16 Japanese chemical companies shows that, as a group, these companies suffered a drop of 8% in sales and 17% in net income during their first fiscal half, which ended Sept. 30, compared with the first half of fiscal 1985. Of these 16 companies, 13 had lower sales and 11 lower net income.

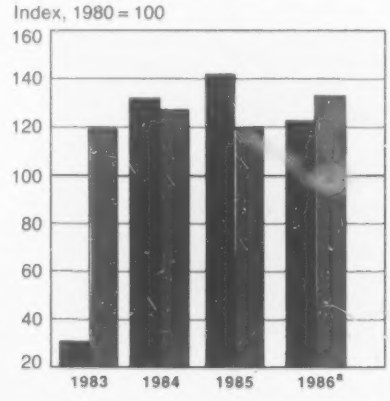
For a half-dozen of these companies, in fact, the profit slump ranged from 30 to 60%. Among the big losers were Unitika, Toray, Teijin, and Kuraray. These four are all major synthetic fiber and textile companies. All put a major part of the blame on a sharp drop in exports. The higher value of the yen has made them uncompetitive in many export markets, particularly with exports from developing countries.

Profitability improves for Japanese petrochemical producers

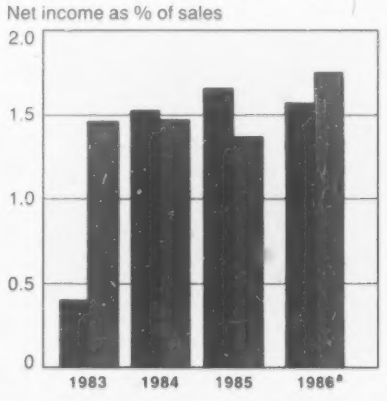
Despite lower sales this year . . .



. . . net income holds up . . .

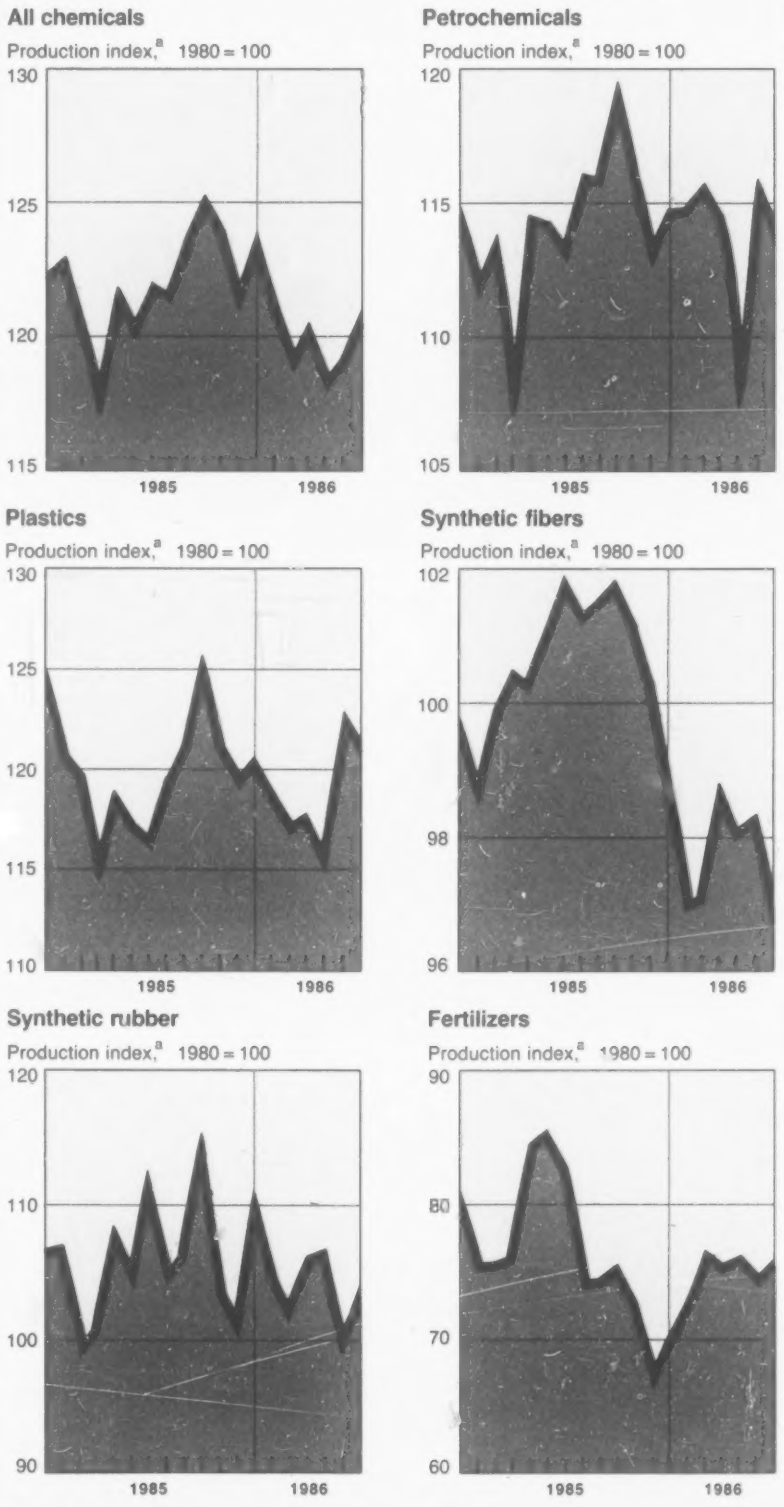


. . . as profit margins edge higher



Note: Based on results of 10 leading Japanese chemical companies: Asahi Chemical Industry, Dainippon Ink & Chemicals, Mitsubishi Chemical Industries, Mitsubishi Petrochemical, Mitsui Toatsu Chemicals, Sekisui Chemical, Showa Denko, Sumitomo Chemical, Teijin, and Toray Industries. For most, but not all of these companies, the fiscal year ends March 31 of the following year. a Estimated. **Source:** Toyo Keizai Shinposha

Sluggishness haunts Japanese chemical production



a Seasonally adjusted. **Source:** Ministry of International Trade & Industry

In fact, the strong yen has affected the entire spectrum of Japan's chemical trade. If the country's chemical trade is looked at in terms of dollars, chemical exports probably will rise 22% this year (to $9.4 billion) and imports will increase 18% (to $9.5 billion).

Looking at the same chemical trade in yen, however, gives an entirely different picture. In yen, Japanese chemical exports will be down 14% this year, and imports will be off about 16%. The drop in imports reflects a weaker domestic economy, but this weaker economy is also a consequence of the strong yen. When Japanese exports of cars, household electrical appliances, and other big-ticket items decline, then domestic demand for the chemicals and plastics that go into them also goes down.

Not all Japanese chemical exports have been adversely affected by the strong yen, however. Exports of general-purpose resins, with the exception of polypropylene, have been higher this year than in 1985.

There are several reasons for this. First, with demand sluggish in their domestic market, producers have more resin available to export. In addition, less competitive material seems to be moving into Japan's all-important Southeast Asian market from the U.S., Europe, and even Saudi Arabia. Finally, several Japanese manufacturers of household appliances and other equipment that use plastics have moved their production out of Japan into other countries. These companies still use Japanese resin, however.

In Japan itself, however, petrochemical imports continue to peck away at the Japanese domestic market. Saudi Arabian polyvinyl chloride started arriving in Japan this year. Producers expect as much as 50,000 metric tons of it to reach Japan in 1986.

Methanol from Saudi Arabia and other countries has been moving into Japan for some time now, as well. Japanese producers can't compete with these imports, and production has slumped from more than 2 million metric tons in the early seventies to 254,000 metric tons last year. It will be less than that this year.

In fact, methanol production soon may be all but phased out in Japan. Mitsui Toatsu, one of only two remaining producers, will scrap all of its capacity except for 55,000 metric tons, which it will use captively. Mitsubishi Gas Chemical, the other producer, will trim its capacity 50 to 60%. Both will turn to imported methanol from Saudi Arabia, Canada, and from countries such as Indonesia and Burma that have just started up production.

Even inorganics, such as caustic soda and soda ash, are being imported increasingly into Japan.

Because of the long-anticipated decline in Japan's basic petrochemical fortunes, Japanese chemical companies are emphasizing diversification into higher-value-added products. Many of Japan's leading chemical companies have been pursuing this strategy for some time. But the impact of the strong yen has given them a new sense of urgency. Specialty plastics, ceramics, pharmaceuticals, and bioengineered products are among the most popular targets.

Balance in chemical trade remains narrowly in the red

Foreign trade in chemicals, $ billions

a C&EN estimates
Source: Ministry of International Trade & Industry

Japan's Ministry of International Trade & Industry is encouraging companies to develop ceramics know-how. Sumitomo Chemical is one chemical company that is doing just that. Sumitomo is working on technology to make silicon carbide/aluminum nitride powders and other ceramic products. Its fine ceramics business, says the company, is "moving into high gear."

Meanwhile, Mitsubishi Chemical Industries is beefing up its engineering plastics business. And Shinetsu Chemical is building a rare-earth refinery that is scheduled to be on stream next March.

Mitsui Petrochemical Industries, meanwhile, is building a new research laboratory designed specifically to develop specialty chemicals. And the company is planning to follow Japanese car makers to the U.S., where it will produce thermoplastic elastomers and other specialties for the automotive market.

Moving into higher-value-added products, however, is a long-term strategy and may not do much to help Japanese chemical companies next year. Private economists in Japan think the cut in the discount rate came too late to help the economy much, if at all. If so, Japanese chemical companies are in for another "year of struggle" next year. □

Chemical production in Japan generally is down this year

Thousands of metric tons unless otherwise indicated	1985	Seven months 1986	Seven months 1985	% change
INORGANIC CHEMICALS				
Ammonia	1981	1061	1177	−10
Ammonium chloride	373	213	225	−5
Ammonium sulfate	1837	1046	1082	−3
Calcium carbide	441	257	282	−9
Calcium superphosphate	529	315	329	−4
Carbon black	632	366	368	−1
Chlorine, liquid	926	528	552	−4
Hydrochloric acid	549	318	319	0
Nitrogen[a]	6220	3673	3642	1
Oxygen[a]	7388	3986	4317	−8
Sodium carbonate	1057	589	621	−5
Sodium hydroxide	3075	1779	1807	−2
Sodium silicate	594	338	335	1
Sulfuric acid	6580	3900	3897	0
Titanium dioxide	217	132	127	4
ORGANIC CHEMICALS				
Acetaldehyde	271	146	157	−7
Acetic acid	344	165	191	−14
Acetone	237	129	134	−4
Acrylonitrile	541	317	311	2
Benzene[b]	2084	1180	1172	1
Butadiene	639	382	364	5
Butanol	258	137	142	−4
Caprolactam	455	263	267	−1
Cyclohexane	524	305	311	−2
Dioctyl phthalate	241	147	141	4
Ethylene	4224	2418	2479	−2
Ethylene dichloride	1901	1077	1105	−3
Ethylene glycol	440	209	255	−18
Ethylene oxide	554	295	323	−9
Methanol	254	131	151	−13
Octanol	230	124	126	−2
Phenol	262	145	146	−1
Phthalic anhydride[b]	162	89	95	−6
Propylene	2980	1761	1703	3
Propylene glycol	219	123	121	2
Styrene	1418	793	811	−2
Terephthalic acid	854	531	466	14
Toluene	803	466	446	4
Toluene diisocyanate	84	46	46	0
Urea	929	500	614	−19
Xylene	1523	881	841	5
PLASTICS				
Phenolic resins	325	182	196	−7
Polyethylene	2027	1159	1154	0
Polypropylene	1304	753	738	2
Polystyrene	1599	905	922	−2
Polyvinyl chloride	1550	872	883	−1
SYNTHETIC RUBBER	1158	677	679	0

a Millions of cubic meters. b Petroleum-based product only. Source: Ministry of International Trade & Industry

CANADA

Depressed fertilizer demand clouds chemical operations

Despite slowing economic growth, earnings are up impressively for several of Canada's major chemical producers

Earl V. Anderson, C&EN New York

Next year, the Canadian economy will move slowly, but surely, into its fifth consecutive year of recovery. That alone should be comforting to Canada's chemical companies. But as events of 1986 have proved very clearly, economic growth alone does not afford them the luxury of complacency.

One major reason for this, of course, is that, with a population of only 27 million people, Canada's domestic market is small. And Canadian chemical companies' world-scale plants depend heavily on export markets where, for many products, competition remains strong and prices remain weak. For several Canadian chemical companies, ammonia and methanol are but two such products they would just as soon forget.

As a result, domestic economic growth alone does not guarantee higher chemical earnings. The Canadian economy, as measured by gross national product, probably will increase about 3% this year, according to most estimates. And several Canadian chemical companies have chalked up impressive earnings gains, at least through the first three quarters.

But certainly not all of them. C-I-L is a good example. It is more diversified than most Canadian chemical companies. In the past, this diversification has helped it weather some economic storms better than other major Canadian chemical firms. Not this year, however. Nine-month earnings were down a disappointing 54% despite a 5% rise in sales.

For C-I-L, as for several other Canadian chemical companies, the problem lies primarily in agricultural markets, especially for ammonia. Chemicals used in the mining industry and by the oil and natural gas industries also are hard hit.

C-I-L's agricultural group lost $7.2 million in the third quarter alone, compared with a $720,000 profit in the third quarter last year. For the first three quarters, the group lost $2.2 million, compared with an $18.7 million profit last year. Behind the drop: lower farm demand and overcapacity that have led to significantly lower ammonia prices.

As a result, C-I-L's agricultural unit is taking steps to "adapt to market realities." One of its ammonia plants is down for maintenance. The company will delay bringing it back on stream until the first quarter of 1987. Demand will be met from inventory. And C-I-L is reducing its staff by offering employees an attractive retirement package.

Other Canadian chemical producers likewise have been hard hit by a depressed agricultural market, both at home and abroad. Although ammonia production is up slightly this year, few if any companies are making money on the product. Meanwhile, output of other agricultural products is slipping. Production of ammonium nitrate will be down about 4% and ammonium phosphate output will be off 5%.

Cominco has shut down its ammonium phosphate plant at Kimberly, B.C., because of worldwide overcapacity and low prices. The

Ethylene, polyethylene outputs score the greatest gains

Thousands of metric tons	Production 1986[a]	1985	1984	1983	1982	% change 1985–86
Ammonia	3760	3620	3493	2885	2509	4%
Ammonium nitrate	1015	1054	969	934	1018	−4
Ammonium phosphate	1240	1301	1383	1259	888	−5
Benzene	660	688	557	580	504	−4
Chlorine	1520	1424	1424	1385	1233	7
Ethylene	1965	1744	1464	1196	1013	13
Hydrochloric acid, 100%	140	158	161	170	135	−11
Phosphoric acid, 100%	590	627	691	656	503	−6
Polyethylene, high density	234	229	227	211	194	3
Polyethylene, low density	870	733	529	412	376	19
Propylene	640	648	665	715	618	−1
Sodium chlorate	365	336	313	294	264	9
Sodium hydroxide	1680	1589	1575	1528	1367	6
Sulfuric acid	3570	3890	4053	3686	3131	−8
Urea	2270	2033	2110	1445	1231	12

a C&EN estimate. **Source:** Statistics Canada

company also has shut down—temporarily, at least—its potash operation near Vanscoy, Sask., where inventories were becoming too high.

Despite a soft ammonia market, Canadian capacity is increasing. Ocelot recently completed its 550,000-metric-ton ammonia plant at Kitimat, B.C. Pincher Creek Nitrogen already has brought on stream the first train of its ammonia plant at Pincher Creek, Alta. The Alberta Gas Ethylene-Cominco ammonia plant, with a capacity of 350,000 metric tons a year, will come on stream in the third quarter of 1987.

Methanol is another problem product for Canadian producers. Ocelot lost about $4.5 million on its petrochemical operations during the first half of 1986 and blames most of the loss on methanol. As a result of poor markets and prices, Alberta Gas Chemical and Celanese Canada, in addition to Ocelot, either have or are cutting back methanol production.

Unlike C-I-L, Celanese Canada is having an excellent year. Through the first nine months, sales were up only 5% but earnings were a hefty 82% higher than last year. Much of the improvement, however, comes from its fiber operations. The company's chemical sales volume is off, primarily because of lower methanol and vinyl acetate exports.

In fact, Canadian chemical exports probably will total about $3.8 billion this year, down about 4% from 1985.

Meanwhile, Canada's economic growth is pulling in more chemical imports. The estimated $4.2 billion in imports will be 6% higher than in 1985. As a result, Canada's chemical trade deficit will increase from last year's paltry $9 million to an uncomfortable $395 million.

Fluctuating exchange rates can do tricks with trade statistics, however. In Canadian dollars, exports will decline only 1.5% this year, while imports will sport an 8% growth rate.

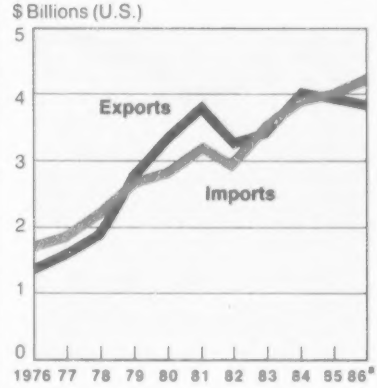
Although first-half figures (the latest available) indicate that exports of plastics and resins are running at about the same level as last year, business is particularly good for some products and producers. At Du Pont Canada, for instance, earnings more than tripled through the first nine months, although sales rose only 6%.

In part, the company credits a strong worldwide demand for polyethylene, which has helped its export sales, and better prices in international markets. Demand for engineering resins also has been strong, both in Canada and in the U.S., which is Canada's major chemical export market.

Du Pont's experience is reflected in this year's production figures for Canadian chemicals. The big gainers, as they have been for the past several years, are low-density polyethylene and its raw material, ethylene. Output of these materials will increase 19% and 13%, respectively. Few other products, with the exception of urea, come close to that kind of increase.

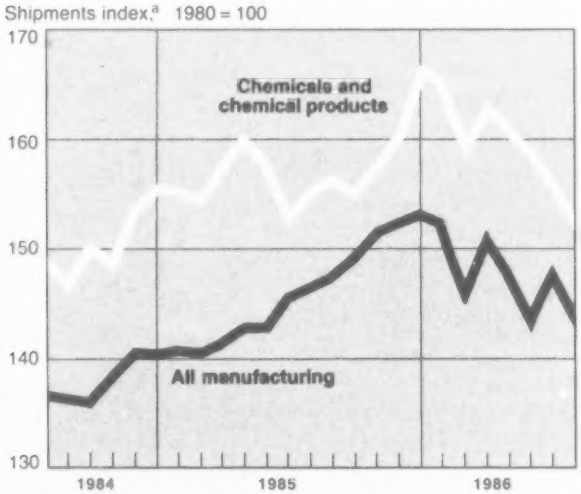
Whether these and other chemical products will be able to turn in better performances next year depends almost as much on the U.S. economy as it does on the Canadian economy. If the economy in the U.S. perks up, Canadian exports likely will improve. Meanwhile, Canadian gross national product will advance between 2 and 2.5% in 1987—not exciting, but not bad either for the fifth year of an economic recovery. □

Chemical trade balance slips into red

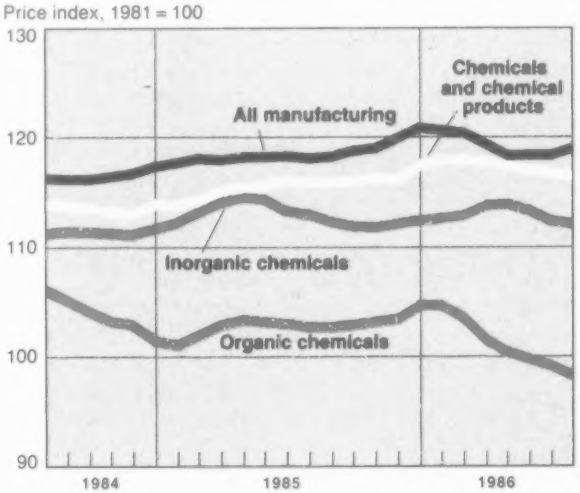


a C&EN estimates **Source:** Statistics Canada

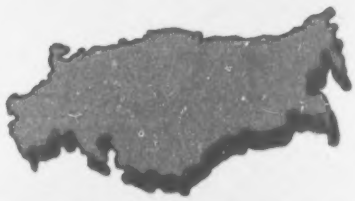
Chemical shipments have been slipping . . .



. . . but most prices have held steady



a Seasonally adjusted. **Source:** Based on Statistics Canada data



U.S.S.R./
EASTERN EUROPE

Chemicals gain high priority in industrial development

Soviet Union targets chemical output to rise nearly one third by 1990 as it plans to emphasize chemicals in its economy

Richard J. Seltzer, C&EN Washington

This month, the Soviet Union and its six East European allies in the Council for Mutual Economic Assistance (CMEA)—Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania—complete the first year of their new five-year plans. Ratified by Communist Party congresses in each country, the plans generally call for more rapid growth in 1986–90 than was achieved or targeted in the previous five years. Although details are not yet defined, the plans give high priority to the chemical industry, as a key industry to spur national industrial and economic development. Indeed, Soviet leaders call for "chemicalization of the national economy."

The Soviet Union's 12th five-year plan, for example, targets a 25% increase in industrial output by 1990, a growth of 4.6% a year. The chemical industry is to raise output 30 to 32% by 1990. Moreover, Soviet leaders set the ambitious goal of doubling national income and industrial production by the year 2000, requiring growth of 4.7% a year.

However, numerous major problems continue to beset Soviet industry—as well as the other CMEA economies. Many western specialists doubt the Soviets will meet their five-year and 15-year targets. Industrial production grew only 3.7% a year between 1981 and 1985 and 4.5% from 1976 to 1980, according to official Soviet statistics. Furthermore, the Central Intelligence Agency estimates that industrial output actually rose just 2% a year in the 1981–85 period and 2.6% from 1976 to 1980—after eliminating upward bias due to hidden inflation and double counting. Soviet industrial growth rates thus continued their long-term decline during the past two decades.

This has been a relatively good year for Soviet and East European economies and industry overall. Growth rates picked up for the U.S.S.R., Poland, East Germany, and Bulgaria, after some slowing in 1985. The two preceding years were also rebound years, following three years of stagnation or even decline. However, results are weaker this year for Czechoslovakia, Hungary, and Romania.

Through September, for instance, Soviet official figures show total industrial output rose 5% compared with the same period last year, surpassing the 4.3% goal for all 1986, and the 4% rise achieved in all 1985. Chemical industry production rose a hefty 8% through September, compared with 5% in all 1985. Fertilizer industry production grew 9%, compared with 7% in all 1985.

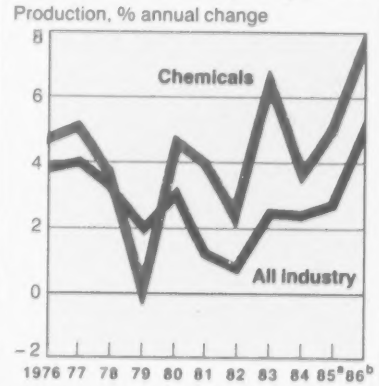
Soviet production of several key chemicals is also up this year, but output of others lags. Through September, sodium hydroxide output was up 7%, versus a 3% rise in all 1985. Increases of 7% were also registered through September for sulfuric acid, synthetic fibers and yarns, and plastics. Last year, sulfuric acid output grew less than 3%, fibers and yarns dropped 0.5%, and plastics rose less than 4%.

On the other hand, through nine months this year, Soviet production of mineral fertilizers rose just 5%, down from almost 8% in all 1985. And pesticide output dropped 5%, after 3% growth last year.

Meanwhile, Poland's industrial production for the first half of 1986 was up 5%, well above the year's target of 3.4%. Last year, its growth slowed to 4% after rebounding to 6% in 1983 and 5% in 1984 from the malaise of earlier years (decreases of 11% in 1981 and 2% in 1982, for example).

Output of the Polish chemical industry rose almost 8%, through June. This compares with growth of less than 3% for all last year, far short of the 1985 target of 8%, and rates of more than 8% in 1983 and almost 6% in 1984. Poland raised output of some key chemicals in the first half of 1986. Nitrogen fertilizer was up 31%, after declining 8% in all 1985. Phosphate fertilizer rose 7% (versus 2% in all 1985). Production also increased for detergents (up 27%) and pharmaceuticals (up more

Soviet chemical growth surpasses industry in general



Note: All figures except for 1986 are based on Central Intelligence Agency estimates, which are lower than official Soviet statistics because of postulated upward bias in Soviet figures. **a** Preliminary. **b** For first nine months. **Sources:** Central Intelligence Agency; Wharton Econometric Forecasting Associates, based on official Soviet figures

than 12%). However, output of man-made fibers was up only 0.5%, plastics rose just 0.6%, and synthetic rubber production dropped 7%.

East Germany aims for higher growth than any other CMEA state, and it seeks to become Eastern Europe's high-technology leader and supplier, notes a recent report published by Wharton Econometric Forecasting Associates. The East Germans stress technological modernization of their industry, increased labor productivity, cost reduction, and development of domestic energy resources. Their new five-year plan calls for industrial output to grow 8.4% a year.

East Germany's midyear results are in accord with its ambitious plans: Industrial output rose 9%. Aiding this rise was an increase of 9% in industrial labor productivity.

As in the U.S.S.R., East Germany gives top priority to its chemical industry: Its target this year is 9.3% growth, a rate exceeded only by the critical electrical engineering and electronics, and the machine tools and process machinery sectors. Chemical production grew almost 10% through June, maintaining the growth rates of between 9 and 11% achieved during the past four years. Nitrogen fertilizers were up more than 22% at midyear, low-density polyethylene up almost 8%, and polyurethanes up 10%.

Bulgaria is recovering from a rough year in 1985: Industrial production rose less than 4%, well short of the 5.2% target. Through June this year, industrial output is up 6% (the goal for all 1986 is 4.5%). However, as a Wharton report points out, official figures have questionable credibility.

The highest growth at midyear was achieved by Bulgaria's top-priority machine-building sector (12%) and by its chemical industry (8%). Output of plastics, synthetic resins, and adhesives was up almost 15% and paints and varnishes 10%. However, fertilizer output fell sharply, with nitrogen fertilizer down almost 26% and phosphate fertilizer down 19%.

Czechoslovakia, Hungary, and Romania are not meeting growth targets this year. Czech chemical and oil refining output rose just 1% through June, down from almost 4% in all 1985 and well short of the 3% goal for 1986. Hungary's poor results in 1985 continue this year. Industrial production rose just 1% through August. Chemical output dropped 1%, mainly because of a fall in oil products and fertilizers.

By all accounts, Romania's economic statistics are sui generis. Data are largely unavailable, and much of what is released—often claiming record-breaking results—is highly inflated. Still, western analysts conclude that Romania had a very bad year in 1985, and continues to lag in 1986. Chemical output barely grew at all last year, by official figures (the target was 15.7%). Plastics production declined 4%, and sulfuric acid and synthetic rubber output were down almost 1% each.

However, analysts note, for 1986 Romania has again set overambitious goals, at levels that have "lost touch with reality." Industrial output is to grow 9% (versus 5% achieved last year, by official figures). Output of chemicals, the main priority sector along with machine building, is to rise more than 8%.

What are the future prospects for CMEA nations? Their five-year plans all emphasize "intensive" rather than "extensive" development—raising output through higher productivity and more efficient management of resources, rather than by greater inputs of fuel, raw materials, capital investment, or labor. Existing enterprises are to be modernized, rather than new ones built. The quality of goods and services is to be raised. And controlled reform will be introduced into the economic system, allowing greater decision making by enterprises and a greater role for market forces, such as prices, wages and other incentives, and profits.

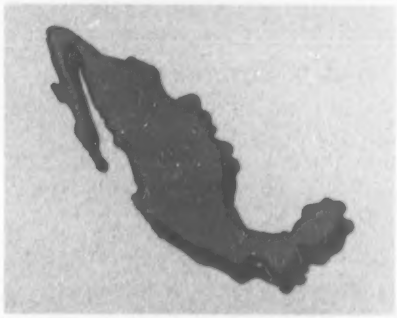
Accelerating introduction of advanced science and technology is the key to the strategy—machine-building and engineering, robotics, electronics, fine chemicals, advanced materials, biotechnology, and other high-technology areas. Science is to be the major source of productivity growth and of increased competitiveness of products in western markets.

However, CMEA nations will not abolish central planning or carry out fundamental structural reforms, which would endanger the authority of current officials. But many western observers consider basic structural reforms essential for any solution to the Soviet bloc's economic problems. □

Soviet chemical output up, but much of East Europe's lags

Thousands of metric tons, 1985	U.S.S.R.	Bulgaria	Czecho-slovakia	East Germany	Hungary	Poland	Romania
Mineral fertilizers[a]	33,200	na	1200	4842	na	2270	3096
Change from 1984	8%	na	5.6%	2%	na	−4%	1%
Nitrogen (N)	14,500	836	582	1078	603	1254	na
Change from 1984	9%	0%	1%	12%	3%	−8%	na
Phosphate (P_2O_5)	8,200[b]	172	353[b]	299[b]	130	889	na
Change from 1984	7%	−18%	3%	−3%	−19%	2%	na
Potassium (K_2O)	10,500	—	na	3465	na	127	na
Change from 1984	7%	—	na	0%	na	8%	na
Sulfuric acid, 100%	26,000	820	1298	882	520	2863	1900
Change from 1984	3%	−10%	5%	0%	−5%	3%	−1%
Ammonia[c]	19,100	na	na	1210	na	na	na
Change from 1984	8%	na	na	0%	na	na	na
Plastics	5,000[d]	na	1100	1044	na	586	628
Change from 1984	4%	na	6%	−1%	na	−1%	−4%
Sodium hydroxide	3,056	157	330	667	194[e]	384	na
Change from 1984	3%	−8%	1%	−4%	0%	1%	na
Synthetic rubber	2,005[f]	26	70	140	—	126	155
Change from 1984	3%	0%	−1%	−8%	—	6%	−1%

a Nutrient content basis. b Includes ground phosphate rock for direct application and phosphate animal feeds. c Nitrogen content. d Includes resins for man-made fibers. e Includes regenerated NaOH. f Estimated by Central Intelligence Agency. **na** = not available. **Sources:** Central Intelligence Agency; East European Statistics Service; Foreign Broadcast Information Service; C&EN estimates, based on official national statistics



MEXICO

Government loosens restrictions on Mexico's petrochemical industry

Chemical officials hope freer competition will boost efficiency, even make Mexico a net exporter of chemicals

Earl V. Anderson, C&EN New York

Next year could be pivotal for the Mexican chemical industry. How it performs in 1987 may well dictate whether the industry will grow the way it hopes to—indeed, the way it expects to—or whether it will continue to be mired in problems that have plagued it for the past several years.

Certainly, Mexico's continuing economic crisis will help color the outcome. However, the government has given the petrochemical industry some impressive tools to work with. It has reclassified many primary (basic) and secondary petrochemicals. Now, some primary petrochemicals, formerly reserved solely for production by Petróleos Mexicanos (Pemex), the state-owned oil company, can be produced by private companies in the secondary petrochemical sector.

The government also has made it possible for these same private companies to import their raw material requirements directly. Previously, only Pemex could import basic petrochemicals to supplement its own output. It then resold the imports to its private-company customers.

Now that Mexico has joined the General Agreement on Tariffs & Trade (GATT), Mexican chemical leaders believe that a fresh breeze of freer international competition will force chemical companies there to become more efficient. And a recently issued report sets some impressive long-term goals for the industry and outlines a strategy to achieve those goals.

The report, significantly a joint government-industry effort, establishes petrochemicals as a priority industry in Mexico. It stresses the need to achieve better harmony among Pemex, the private petrochemical sector, and the ultimate end user. That harmony is conspicuously absent right now. And the report outlines the steps to be taken to make Mexico's petrochemical industry a major net exporter.

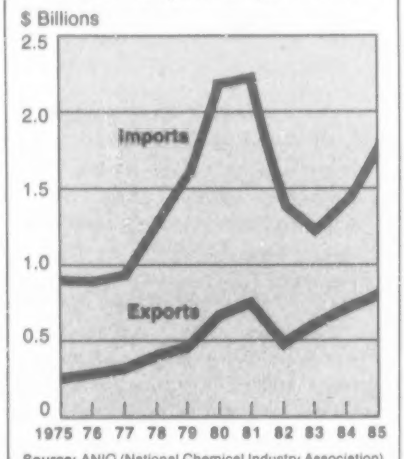
That's an ambitious goal but one that Mexican chemical leaders feel can be achieved. In fact, many of them are irked because Mexico, with its enviable hydrocarbon resources, continually runs a chemical trade deficit. Last year's deficit of $968 million was the highest since 1981.

Significantly, most of the increase last year was caused by trade in basic petrochemicals. Exports of these products declined 41%, and imports rose 24% to a record $681 million. As a result, Mexico's deficit in basic petrochemicals jumped 50% to $605 million, almost twice the deficit for all other chemicals.

It's obvious that it is in petrochemicals that Mexico's major chemical headaches lie. If this basic petrochemical dilemma can be solved, the rest of the chemical industry will fall into place.

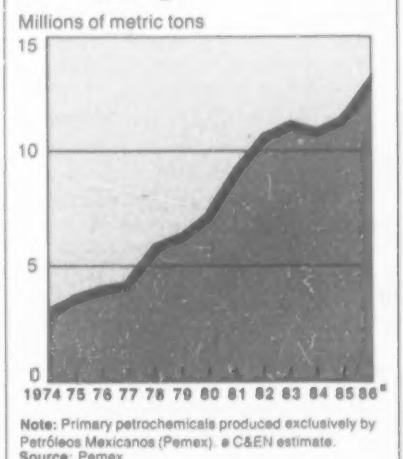
Pemex's petrochemical investment program is expected to help. It will spend $2.5 billion over the next six years to put an additional 3.7 million metric tons of capacity on stream. Some new units will be operating next year. But Pemex's major project is a petrochemical complex at Morelos. These units will be starting up between 1988 and 1991. □

Chemical trade deficit widens despite export rise



Source: ANIQ (National Chemical Industry Association)

Basic petrochemical output hits new high



Note: Primary petrochemicals produced exclusively by Petróleos Mexicanos (Pemex). *C&EN estimate.
Source: Pemex